COST TO HARVEST HAYLAGE: A SNAPSHOT
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Forage production is an important activity on traditional dairy farms in the Northeast. Significant time and effort is spent growing hay and corn for forage during the year. With the increasing costs of inputs, maintaining and replacing machinery, and tightening margins on dairy farms, more interest is being expressed in what the costs are associated with growing these feeds. With very few farms utilizing activity based accounting systems, there is no easy way to identify costs associated with growing forages.

As part of on-going efforts to determined costs of different activities on farms, the range in these costs, and which areas contribute the most to that range, a small study of the harvest costs associated with haylage production was undertaken in the summer of 2011.

STUDY METHODOLOGY

When analyzing the costs associated with the harvesting of haylage, it has been difficult to utilizing on-farm accounting systems as most farms don't utilized activity based accounting programs, so costs associated with the harvesting activities have not been tracked or recorded. The focus of the study is to utilize farm-level data to determine the costs associated with harvesting haylage, primarily 1st cutting, and what difference may exist between farms.

For this study, a set of forms were developed to record daily activity during the haylage harvest on participating farms. Additional forms were utilized to collect data associated with ownership of the equipment utilized.

14 farms were identified and agreed to participate in the study. Participating farms utilized the forms for each piece of equipment to collect hours of operation, fuel use, acres covered, and tons harvested. For each piece of equipment, ownership and operating costs were determined, based on farm records, operating history, and activities that the equipment performed.

With the intent to determine the total cost of the harvest activity, the following cost areas were determined for each of the main five actives occurring during the harvest: mowing, merging, harvesting, hauling, and packing.

Labor	Fuel
Repair	Depreciation
Interest	Insurance

If farms were utilizing custom services for part or all of their harvesting activities, these costs were assigned to custom services, and not to the specific tasks that were performed. Also, if the farm owned equipment as back-up in case of breakdowns, these ownership costs were also identified.

This data set is not designed to represent the average costs to harvest, but is a snapshot of what the range of costs may be, and which cost areas or activities is contributing to the range. The primary purpose of this effort was to develop tools and approaches to look at harvesting activities, along with providing a snapshot of what costs may be for harvesting haylage.

COST PER ACRE TO HARVEST HAYLAGE

Table 1 summaries the total costs per acre to harvest haylage for the 14 participating farms during the summer of 2011. While the majority of data is associated with first cutting, two of the farms report data associated with 2nd or 3rd cutting. The total cost average $52.95 per acre, ranging from $41.30 to $73.01 per acre. Depreciation expense was the single largest expense, representing 22.8% of the total cost. Interest on investment was the second largest, followed by fuel, than labor, and custom services.

The average acres covered during the time the participating farms tracked information was 419, ranging from 100 to 910. As fed tons harvested per acre averaged 4.30, ranging from 1.13 to 6.83.

With the participating farms primarily tracking 1st cutting and the challenging growing conditions during 2011, the range in yields and costs was impacted. Whether or not dump wagons were utilized, how well trucks were able to operate in fields, and what the yield was, especially for the two farms reporting 2nd or 3rd cutting, impacted the range of results.

Cost by Activity

By collecting information by piece of equipment and activity, it is possible to report on the costs associated with each of the main activities undertaken during harvest. Table 2 summaries the cost by activity on a per acre, per wet ton, and per dry matter ton basis. Harvesting, at 27.1% of the total, was the single largest expense activity. Trucking was the second largest at 22.7%, followed by mowing and then merging. Custom services represented 12.6 % of the average across the 14 farms, but ranged from 0 for the majority of the farms to 82% for the farm utilizing custom services to the majority of the harvesting activities. The costs associated with owning and maintaining equipment that are in a back-up role represent just 1% of the total cost.

Table 1

Cost Per Acre to Havest Haylage
14 New York Dairy Farms, Summer 2011
Cost per Expense Item

	Average Cost per Acre		Range	
Operating Costs per Acre				
Labor	$7.86		$2.00	$16.87
Percent of Total	15.0%		2.7%	27.1%
Cost per Labor Hour	$15.32		$12.00	$20.00
Fuel	$9.36		$3.94	$15.22
Percent of Total	17.9%		6.9%	25.5%
Cost per Gallon	$3.35		$3.08	$3.62
Repair	$6.10		$0.05	$10.43
Percent of Total	12.2%		0.1%	20.1%
Total Operating Costs per Acre		$23.27	$9.69	$39.07
Percent of Total		45.1%	17.0%	62.7%
Ownership Costs per Acre				
Depreciation	$11.35		$0.05	$18.22
Percent of Total	22.8%		0.1%	35.8%
Interest	$9.01		$0.07	$14.65
Percent of Total	18.1%		0.1%	31.1%
Insurance	$0.64		$0.00	$1.24
Percent of Total	1.4%		0.0%	3.0%
Total Ownership Costs per Acre		$21.32	$0.13	$30.65
Percent of Total		42.3%	0.2%	60.0%
Custom Services	$8.18		$0.00	$60.00
Percent of Total	12.6%		0.0%	82.2%
Total Costs per Acre	$52.95		$41.30	$73.01
Acres Analyzed	419		100	910
Tons Harvested	1875		184	4,152
% Dry Matter	40.1%		35%	49%
Dry Matter Tons Harvested	764		84	1,697
Total Hours(Harvester)	30.9		5.5	84
Acres Covered per Operating Hour	18.2		9.1	40.5
Average Field Size, Acres	25.9		10.7	72.5
Average Field Distance from Storage	2.75		0.85	6
Fuel Gallons per Acre	2.81		1.2	4.2
As Fed Tons per Acre	4.30		1.13	6.83
Dry Matter Tons per Acre	1.70		0.52	2.40
Fuel Gallons per Ton, As Fed	0.71		0.29	1.59

Table 2

Cost To Harvest Haylage
14 New York Dairy Farms, Summer 2011
Cost by Activity, per Acre, per Wet Ton, per Dry Ton

All Harvesting Activities, Per Acre	Average Cost	Range	
Mowing	$8.65	$6.11	$15.39
Percent of Total	17.1%	11.2%	31.3%
Merging	$6.44	$4.26	$12.21
Percent of Total	12.6%	10.3%	23.5%
Harvesting	$13.87	$10.84	$22.99
Percent of Total	27.1%	19.9%	45.0%
Trucking	$11.64	$7.47	$23.41
Percent of Total	22.7%	13.2%	43.0%
Packing	$3.76	$2.30	$6.77
Percent of Total	7.0%	4.9%	12.2%
Back-Up Equipment	$0.41	$0.00	$3.69
Percent of Total	0.9%	0.0%	7.8%
Custom Services	$8.18	$0.00	$60.00
Percent of Total	12.6%	0.0%	82.2%
Total Costs per Acre	$52.95	$45.64	$73.01

All Harvesting Activities, Per Wet Ton	Average Cost	Range	
Tons per Acre	4.30	1.13	6.83
Mowing	$2.37	$1.37	$6.41
Merging	$1.86	$0.96	$7.16
Harvesting	$4.31	$2.04	$20.29
Trucking	$3.17	$1.80	$7.07
Packing	$0.95	$0.63	$2.58
Back-Up Equipment	$0.21	$0.00	$1.58
Custom Services	$1.63	$0.00	$10.71
Total All Cost per Wet Ton	$14.50	$10.25	$45.10

All Harvesting Activities, Per Dry Ton	Average Cost	Range	
Dry Matter	40.1%	35.0%	49.0%
Tons Dry Matter per Acre	1.70	0.52	2.40
Mowing	$5.80	$3.43	$14.07
Merging	$4.43	$2.74	$15.72
Harvesting	$10.40	$4.53	$44.54
Trucking	$7.76	$4.53	$15.52
Packing	$2.36	$1.61	$5.66
Back-Up Equipment	$0.46	$0.00	$3.47
Custom Services	$4.64	$0.00	$30.60
Total All Cost per Ton Dry Matter	$35.86	$23.52	$98.94

Cost per Ton

While the cost data was primarily determined on a per acre basis, the farms also provided yield data for the acres covered. This information was provided through a number of means, from yield monitors, to scales, to estimates based on number of loads and amount of each load. With the different degrees of accuracy of the yield information, some of the range in the costs would be impacted by the accuracy of the yields.

Referring to Table 2, the average cost per ton of as fed haylage was $14.50, ranging from $10.25 to $45.10. The average yield per acre was 4.30 tons, ranging from 1.13 tons per acre(2nd or 3rd cutting) to 6.83 tons per acre.

On a dry matter basis, the cost per ton averaged $35.86, ranging from $23.52 to $98.94 a ton. 1.70 tons of dry matter per acre was harvested on average, ranging from .52 to 2.40.

Cost by Category of Equipment, Per Expense Item

The third area that the information was summarized for the harvest costs was by each category of equipment, summarizing the 5 expense items. Tables 3 thru 7 summarize the costs for the mowing, merging, harvesting, trucking/hauling, and packing equipment areas. The tables summarize the data for the 12 farms that were not utilizing custom services for any of these areas.

For each equipment area, the cost per hour, cost per acre, and range per acre is reported. The costs are for all pieces of equipment that were utilized, whether 1 mower or 3 mowers. The investment information for each equipment area is summarized at the bottom of the appropriate table. The percent harvesting number is the percent of the equipment's total hours that was allocated to the forage harvesting over a year's time. This percent was utilized to allocate the annual machinery costs to the harvest activity. The annual acres represent the total number of acres covered by that piece of equipment during the year, for all cuttings of haylage and/or corn silage.

Harvesting cost was the highest per hour, representing a total cost of $300.57 per hour. Following the harvesting costs was the mowing equipment at $163.93 per hour. Merging came in at $102.40 per hour. Trucking and packing were $69.87 and $41.29 respectively.

Table 3

Haylage: Mowing Equipment
12 New York Dairy Farms, Summer 2011
Cost per Expense Item

	Average	Average			
Operating Costs	Cost per Hour	Cost per Acre	Percent	Range per Acre	
Labor	$18.93	$1.11	11.5%	$0.62	$3.14
Cost per Labor Hour		$17.15		$12.00	$25.00
Fuel	$31.57	$1.84	19.3%	$1.17	$3.14
Cost per Gallon		$3.33		$3.08	$3.51
Repair	$19.52	$1.14	11.9%	$0.47	$3.08
Total Operating Costs	**$69.86**	**$4.08**	**42.6%**	**$2.78**	**$7.19**
Ownership Costs					
Depreciation	$52.13	$3.04	31.8%	$1.67	$5.63
Interest	$39.14	$2.28	23.9%	$0.89	$4.45
Insurance	$2.52	$0.15	1.5%	$0.06	$0.29
Total Ownership Costs	**$94.09**	**$5.49**	**57.4%**	**$2.77**	**$10.29**
Total Costs	**$163.93**	**$9.57**		**$6.11**	**$15.39**
Original Investment		$165,608		$66,300	$280,000
Useful Life, Years		10.3		5.0	16.2
Salvage Value Percent		38.9%		15.1%	62.2%
Annual Acres		2,887		1,200	4,740
Percent Harvesting		77.8%		31%	100%
Acres per Hour		17.1		7.2	26.8
Fuel per Hour		9.5		4.0	15.7

Table 4

Haylage: Merging Equipment
12 New York Dairy Farms, Summer 2011
Cost per Expense Item

	Average	Average			
Operating Costs	Cost per Hour	Cost per Acre	Percent	Range per Acre	
Labor	$16.36	$1.12	16.0%	$0.67	$2.40
Cost per Labor Hour		$14.84		$10.00	$20.00
Fuel	$11.90	$0.82	11.6%	$0.42	$1.63
Cost per Gallon		$3.34		$3.07	$3.52
Repair	$16.77	$1.15	16.4%	$0.41	$2.65
Total Operating Costs	**$45.04**	**$3.09**	44.0%	**$2.07**	**$5.93**
Ownership Costs					
Depreciation	$30.22	$2.08	29.5%	$0.76	$3.93
Interest	$25.32	$1.74	24.7%	$0.58	$2.80
Insurance	$1.82	$0.51	7.2%	$0.05	$0.28
Total Ownership Costs	**$57.36**	**$3.94**	56.0%	**$1.44**	**$6.96**
Total Costs	**$102.40**	**$7.03**		**$6.11**	**$12.21**
Original Investment		$168,067		$72,000	$336,000
Useful Life, Years		13.8		8.0	22.4
Salvage Value Percent		38.8%		23.7%	64.0%
Annual Acres		2,749		1,425	4,640
Percent Harvesting		61.4%		34%	82%
Acres per Hour		14.6		9.6	20.4
Fuel per Hour		3.6		2.2	6.7

Table 5

Haylage: Harvesting Equipment
12 New York Dairy Farms, Summer 2011
Cost per Expense Item

	Average Cost per Hour	Average Cost per Acre	Percent	Range per Acre	
Operating Costs					
Labor	$21.22	$1.15	7.1%	$0.63	$2.63
Cost per Labor Hour		$18.38		$13.28	$23.00
Fuel	$47.16	$2.56	15.7%	$1.15	$4.30
Cost per Gallon		$3.15		$3.08	$3.50
Repair	$41.68	$2.27	13.9%	$0.83	$3.28
Total Operating Costs	**$110.06**	**$5.98**	36.6%	**$3.14**	**$10.12**
				20.8%	57.4%
Ownership Costs					
Depreciation	$113.95	$6.19	37.9%	$2.30	$11.76
Interest	$73.78	$4.01	24.5%	$2.26	$6.26
Insurance	$2.78	$0.15	0.9%	$0.00	$0.25
Total Ownership Costs	**$190.51**	**$10.35**	63.4%	**$5.59**	**$18.21**
Total Costs	**$300.57**	**$16.34**		**$10.84**	**$22.99**
Original Investment		$259,733		$170,000	$430,000
Useful Life, Years		7.8		4.0	15.0
Salvage Value Percent		45.7%		18.6%	64.4%
Annual Acres		3,800		2,350	5,900
Percent Harvesting		100.0%		100%	100%
Acres per Hour		18.4		9.1	40.5
Fuel per Hour		14.3		10.4	20.5
Tons per Hour		66.7		45.9	93.2

Table 6

Haylage: Hauling Equipment
12 New York Dairy Farms, Summer 2011
Cost per Expense Item

	Average Cost per Hour	Average Cost per Acre	Percent	Range per Acre	
Operating Costs					
Labor	$16.03	$2.08	22.9%	$0.73	$6.12
Cost per Labor Hour		$14.27		$10.71	$17.00
Fuel	$12.38	$1.61	$0.18	$0.97	$4.36
Cost per Gallon		$3.47		$3.07	$3.79
Repair	$13.62	$1.77	$0.19	$1.28	$4.33
Total Operating Costs	**$42.02**	**$5.46**	60.1%	**$4.35**	**$13.36**
				54.3%	81.7%
Ownership Costs					
Depreciation	$13.93	$1.81	$0.20	$0.80	$11.80
Interest	$11.47	$1.49	$0.16	$0.52	$4.54
Insurance	$2.45	$0.32	$0.04	$0.10	$0.87
Total Ownership Costs	**$27.85**	**$3.62**	39.9%	**$1.67**	**$10.05**
Total Costs	**$69.87**	**$9.09**		**$6.61**	**$23.41**
Original Investment		$206,417		$60,500	$525,000
Useful Life, Years		14.8		8.0	23.7
Salvage Value Percent		30.0%		12.6%	41.0%
Annual Acres		2,957		1,322	4,855
Percent Harvesting		74.2%		15%	99%
Fuel per Hour		3.6		1.5	6.0
Tons per Hour		22.1		11.5	46.6

Table 7

Haylage: Packing Equipment
12 New York Dairy Farms, Summer 2011
Cost per Expense Item

	Average	Average			
Operating Costs	Cost per Hour	Cost per Acre	Percent	Range	
Labor	$15.06	$1.17	36.5%	$0.73	$6.12
Cost per Labor Hour		$15.56		$10.71	$17.00
Fuel	$15.69	$1.22	38.0%	$0.97	$4.36
Cost per Gallon		$3.35		$3.07	$3.79
Repair	$2.87	$0.22	7.0%	$1.28	$4.33
Total Operating Costs per Acre	**$33.60**	**$2.60**	81.4%	**$4.35**	**$13.36**
Ownership Costs					
Depreciation	$3.56	$0.28	8.6%	$0.80	$11.80
Interest	$3.79	$0.29	9.2%	$0.52	$4.54
Insurance	$0.32	$0.02	0.8%	$0.10	$0.87
Total Ownership Costs	**$7.67**	**$0.59**	18.6%	**$1.67**	**$10.05**
Total Costs	**$41.29**	**$3.20**		**$6.61**	**$23.41**
Original Investment		$156,617		$60,500	$525,000
Useful Life, Years		15.1		8.0	23.7
Salvage Value Percent		39.4%		12.6%	41.0%
Percent Harvesting		51.1%		15%	99%
Cost per Ton Dry Matter		$2.25		$1.41	$3.09
Fuel per Hour		4.75		1.70	7.40

Summary

There is a large range in the costs associated with harvesting haylage among these fourteen farms. Costs were impact by many different variables: investment level, amount assigned to the harvesting activities, total number of acres covered during the year by the equipment, cost of fuel, cost of labor, the yield, field size, distance from storage, and travel time.

While this study is not comprehensive enough to identify the impact that any individual factor has on costs, it does provide a snapshot of what the costs may be for harvesting haylage and what the range of some of the different variables are. This study also led to the development of a tool that can be utilized by farms to estimate their costs, or to calculate their costs if they track different areas within their business. In the future, additional efforts may be taken to look at haylage harvesting costs in a more comprehensive study, or to look at corn silage harvest costs.